State/Industry Network

Air Quality Report

1st Quarter 1998

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Air Quality Monitoring Branch
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North Dakota Department of Health

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SECTION ONE

DISCUSSION OF

MONITORING RESULTS

Sulfur Dioxide (SO_2)

There were no exceedances of either the State or Federal standards during the quarter. The maximum 1-hour concentration was 241 ppb on February 28 at Mandan Refinery - SPM; the maximum 3-hour concentration was 224 ppb on February 28 at Mandan Refinery - SPM; and, the maximum 24-hour concentration was 143 ppb on February 28 at Mandan refinery - SPM. All sites achieved at least an 80% data recovery for the period operated except Dunn Center.

Dunn Center failed to achieve 80% data recovery due equipment malfunctions.

Sulfur dioxide monitoring at Bear Paw - MGP #5 began on January 27.

Sulfur Dioxide (SO_2) 5-Minute Average

The maximum 5-minute concentration was 295 ppb on February 28 at Mandan Refinery - SPM.

Hydrogen Sulfide (H_2S)

There were no exceedances of the H_2S standards during the quarter. The maximum 1-hour concentration was 116 ppb on March 31 at Amerada Hess - Tioga #2; the maximum 24-hour concentration was 7 ppb on March 31 at Amerada Hess - Tioga #2; the maximum 3-month concentration was 2 ppb in March at Amerada Hess - Tioga #2. All sites achieved at least an 80% data recovery for the period operated.

Ozone (O_3)

There was no exceedance of the ozone standard during the quarter. The maximum observed 1-hour concentration was 58 ppb on March 19 at Hannover. The maximum 8-hour concentration was 56 ppb at Hannover on March 19. All sites achieved at least an 80% data recovery for the period operated.

The TRNP - NU analyzers were shut done for the winter effective September 30. The Beulah analyzer was restarted effective January 1 to provide data for epidemiological studies.

Nitrogen Dioxide (NO_2)

The maximum 1-hour concentration observed was 115 ppb on January 8 at DGC #17. All sites achieved at least an 80% data recovery for the period operated.

Inhalable $PM_{2.5}$ Particulates

The maximum 24-hour average concentration was 18.1 $\mu g/m^3$ on March 6 at Bismarck Residential. Both sites achieved at least an 80% data recovery for the period operated.

Inhalable PM_{10} Particulates

There was no exceedance of the 24-hour standard during the quarter. The maximum 24-hour average concentration was 38.4 $\mu g/m^3$ on January 17 at Grand Forks - North. All sites achieved at least an 80% data recovery for the period operated except Dragswolf.

Dragswolf failed to achieve 80% due to equipment problems.

Inhalable $PM_{2.5}$ Sulfates (SO_4)

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO_2 emissions on inhalable particulate concentrations and visibility. The maximum 24-hour $PM_{2.5}$ sulfate concentration was 5.3 $\mu g/m^3$ on March 6 at Bismarck Residential.

Inhalable PM_{10} Sulfates

The purpose for sulfate analysis is to aid the Department in assessing the impact of SO_2 emissions on inhalable particulate concentrations and visibility. The maximum 24-hour PM_{10} sulfate concentration was 6.7 $\mu g/m^3$ on march 18 at Williston Residential. All sites achieved at least an 80% data recovery for the period operated.

$PM_{2.5}$ Sulfate /$PM_{2.5}$ Analysis

The $PM_{2.5}$ sulfate/$PM_{2.5}$ total mass tables present statistics for $PM_{2.5}$ sulfate and $PM_{2.5}$ total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 $\mu g/m^3$ for $PM_{2.5}$ sulfate analysis; 4 $\mu g/m^3$ for $PM_{2.5}$ total mass. Statistics for the ratio are produced by evaluating the ratio of the $PM_{2.5}$ sulfate concentration to the $PM_{2.5}$ total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the $PM_{2.5}$ total mass concentration is less than 4 $\mu g/m^3$, the $PM_{2.5}$ sulfate concentration can be higher than the $PM_{2.5}$ total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of $PM_{2.5}$ sulfate concentration to $PM_{2.5}$ total mass concentration, only data pairs where both the $PM_{2.5}$ sulfate and $PM_{2.5}$ total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum $PM_{2.5}$ Sulfate/$PM_{2.5}$ total mass ratio was 0.426 (42.6%) on March 24 at Bismarck Residential. The maximum average ratio was 0.296 (29.6%) at Beulah.

PM_{10} Sulfate/PM_{10} Analysis

The PM_{10} sulfate/PM_{10} total mass tables present statistics for PM_{10} sulfate and PM_{10} total mass when both concentrations are greater than the respective minimum detectable concentration: 0.5 µg/m^3 for PM_{10} sulfate analysis; 4 µg/m^3 for PM_{10} total mass. Statistics for the ratio are produced by evaluating the ratio of the PM_{10} sulfate concentration to the PM_{10} total mass concentration for each data pair. In the individual summaries, one-half of the minimum detectable concentration is substituted for those concentrations less than the minimum detectable value. However, when the PM_{10} total mass concentration is less than 4 µg/m^3, the PM_{10} sulfate concentration can be higher than the PM_{10} total mass concentration. This is because of the variability in the sulfate analysis procedure at low concentrations. Therefore, when calculating the ratio of PM_{10} sulfate concentration to PM_{10} total mass concentration, only data pairs where both the PM_{10} sulfate and PM_{10} total mass concentrations are greater than the minimum detectable concentrations are used. When the ratio is multiplied by 100, it becomes the percentage of total mass which is sulfate. The maximum PM_{10} Sulfate/PM_{10} total mass ratio was 0.707 (70.7%) on January 5 at Bismarck Residential. The maximum average ratio was 0.367 (36.7%) at Sharon.

SECTION TWO

AMBIENT AIR QUALITY DATA

SUMMARIES

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1 - HOUR 1ST MM/DD/HH	1 - HOUR 2ND MM/DD/HH	3 - HOUR 1ST MM/DD/HH	3 - HOUR 2ND MM/DD/HH	24 - HOUR 1ST MM/DD	24 - HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
AMERADA HESS - TIOGA #1	1998	JAN-MAR	2140	19 03/08/12	17 03/20/03	14 02/02/20	12 03/08/14	6 01/21	5 03/08	1.5			18.4
AMERADA HESS - TIOGA #3	1998	JAN-MAR	2141	59 01/15/23	41 01/23/05	29 01/15/23	27 03/13/14	7 02/12	7 03/13	2.0			24.0
BEAR PAW - MGP #3	1998	JAN-MAR	2143	49 01/28/10	27 01/28/09	26 01/28/11	10 03/04/14	4 01/28	4 03/04	1.4			13.5
BEAR PAW - MGP #5	1998	JAN-MAR	1508 ***	54 03/23/08	35 03/23/09	28 03/23/08	24 03/23/14	9 03/23	5 02/17	1.6			13.9
BEULAH	1998	JAN-MAR	2150	178 03/08/11	82 02/26/09	76 03/08/11	61 02/26/11	17 02/26	16 03/08	3.2			58.9
DGC #12	1998	JAN-MAR	2148	66 01/08/18	60 02/02/10	50 02/02/11	39 01/08/14	17 01/08	12 01/20	3.8			64.2
DGC #14	1998	JAN-MAR	2145	212 03/30/14	165 03/30/12	169 03/30/14	60 03/30/17	38 03/30	7 02/20	2.5			31.2
DGC #16	1998	JAN-MAR	2146	65 03/24/00	50 02/17/10	27 02/17/11	26 03/30/11	10 02/02	9 03/30	3.3			70.3
DGC #17	1998	JAN-MAR	2142	186 02/15/11	126 02/15/12	100 02/15/14	81 02/15/11	34 02/15	14 02/24	4.2			72.1
DUNN CENTER	1998	JAN-MAR	1711 ***	31 03/04/06	22 03/30/09	21 03/04/08	16 02/02/14	5 03/04	3 03/30	1.5			19.5
FARGO RESIDENTIAL	1998	JAN-MAR	2150	23 01/01/05	20 02/03/12	14 02/26/05	12 02/26/02	6 02/26	4 03/15	1.9			39.8
HANNOVER	1998	JAN-MAR	2145	72 03/31/10	57 03/31/11	48 03/31/11	34 03/28/17	10 03/28	10 03/31	2.7			35.1
MANDAN REFINERY - SPM	1998	JAN-MAR	2143	241 02/28/01	228 02/28/02	224 02/28/02	202 02/28/05	143 02/28	116 02/27	10.6		2	39.7
SHARON	1998	JAN-MAR	1828	36 01/14/10	15 03/07/11	16 01/14/11	15 03/07/14	10 01/12	10 01/13	2.0			32.4

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : SULFUR DIOXIDE (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMUM 1 - HOUR 1ST MM/DD/HH	MAXIMUM 1 - HOUR 2ND MM/DD/HH	MAXIMUM 3 - HOUR 1ST MM/DD/HH	MAXIMUM 3 - HOUR 2ND MM/DD/HH	MAXIMUM 24 - HOUR 1ST MM/DD	MAXIMUM 24 - HOUR 2ND MM/DD	ARITH MEAN	1HR #>273	24HR #>99	% >MDV
TRNP - NU	1998	JAN-MAR	2146	14 03/04/14	14 03/04/15	12 01/20/20	11 03/04/14	6 01/20	5 03/04	1.5			23.3
WHITE SHIELD	1998	JAN-MAR	2149	42 01/21/08	38 01/21/07	35 01/21/08	31 01/21/11	11 01/21	6 02/02	2.4			52.0

The maximum 1-hour concentration is 241 ppb at MANDAN REFINERY - SPM on 02/28/01
The maximum 3-hour concentration is 224 ppb at MANDAN REFINERY - SPM on 02/28/02
The maximum 24-hour concentration is 143 ppb at MANDAN REFINERY - SPM on 02/28

* The air quality standards are:
  STATE Standards -
    1) 273 ppb maximum 1-hour average concentration.
    2) 99 ppb maximum 24-hour average concentration.
    3) 23 ppb maximum annual arithmetic mean concentration.

  FEDERAL Standards -
    1) 500 ppb maximum 3-hour concentration not to be exceeded more than once per year.
    2) 140 ppb maximum 24-hour concentration not to be exceeded more than once per year.
    3) 30 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Sulfur Dioxide 5-Minute Averages (ppb)

LOCATION	YEAR	PERIOD	OBS	5-MINUTE MAXIMA 1ST	DATE MM/DD/HH	2ND	DATE MM/DD/HH	3RD	DATE MM/DD/HH	# HOURS >600	% >MDV
BEAR PAW - MGP #3	1998	JAN-MAR	1441	65	03/21/02	36	03/21/10	29	02/09/15	0	18.8
BEAR PAW - MGP #5	1998	JAN-MAR	1508	184	03/23/09	134	03/23/08	91	03/23/13	0	23.0
BEULAH	1998	JAN-MAR	2150	205	03/08/12	202	03/08/11	199	02/22/16	0	70.0
DUNN CENTER	1998	JAN-MAR	1711	52	03/04/06	44	03/04/05	42	03/30/09	0	26.5
FARGO RESIDENTIAL	1998	JAN-MAR	2150	23	01/01/05	20	02/01/12	19	02/03/11	0	39.8
HANNOVER	1998	JAN-MAR	2145	143	03/28/15	117	03/28/11	109	02/02/16	0	43.6
MANDAN REFINERY - SPM	1998	JAN-MAR	2143	295	02/28/01	289	02/28/02	281	02/28/00	0	49.9
SHARON	1998	JAN-MAR	1828	36	01/14/10	15	03/14/11	15	03/07/12	0	32.4
TRNP - NU	1998	JAN-MAR	2146	17	02/15/18	16	03/15/09	15	03/04/14	0	32.0

The maximum 5-minute concentration is 295 ppb at MANDAN REFINERY - SPM on 02/28/01

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Hydrogen Sulfide (ppb)

				M A X I M A								
				1 - HOUR		24 - HOUR		3 - MONTH				
LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	1ST MM/DD/HH	2ND MM/DD/HH	1ST MM/DD	2ND MM/DD	1ST MM	2ND MM	ARITH MEAN	1HR #>200	24HR #>100	% >MDV
AMERADA HESS - TIOGA #2	1998	JAN-MAR	2138	116 03/31/15	40 03/21/20	7 03/31	4 01/06	2 01	2 03	1.8			22.0
TRNP - NU	1998	JAN-MAR	2147	13 03/17/07	10 01/07/09	3 01/07	2 03/17	2 01	1 03	1.2			10.4

The maximum 1-hour concentration is 116 ppb at AMERADA HESS - TIOGA #2 on 03/31/15
the maximum 24-hour concentration is 7 ppb at AMERADA HESS - TIOGA #2 on 03/31
The maximum 3-month concentration is 2 ppb at AMERADA HESS - TIOGA #2 on 01

* The State air quality standards are:
1) 10 ppm maximum instantaneous (ceiling) concentration not to be exceeded.
2) 200 ppb maximum 1-hour average concentration not to be exceeded more than once per month.
3) 100 ppb maximum 24-hour average concentration not to be exceeded more than once per year.
4) 20 ppb maximum arithmetic mean concentration averaged over three consecutive months.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Ozone (PPB)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1-HOUR 1ST MM/DD/HH	1-HOUR 2ND MM/DD/HH	1-HOUR 3RD MM/DD/HH	8-HOUR 1ST MM/DD/HH	8-HOUR 2ND MM/DD/HH	8-HOUR 3RD MM/DD/HH	1HR #>120	8HR #>80
BEULAH	1998	JAN-MAR	2152	61 03/19/14	60 03/08/15	60 03/08/16	56 03/19/10	53 03/19/09	53 03/19/08		
FARGO RESIDENTIAL	1998	JAN-MAR	2151	53 03/28/14	53 03/28/15	52 03/07/16	50 03/28/09	46 03/28/08	46 03/28/10		
HANNOVER	1998	JAN-MAR	2147	58 03/19/23	57 03/08/12	57 03/19/17	56 03/19/17	52 03/19/16	52 03/19/15		
SHARON	1998	JAN-MAR	2152	54 03/06/15	53 03/06/16	52 03/06/14	51 03/20/10	49 03/20/09	49 03/06/13		

The maximum 1-hour concentration is 61 ppb at BEULAH on 03/19/14
The maximum 8-hour concentration is 56 ppb at BEULAH on 03/19/10

* The air quality standards for ozone are:
STATE - 120 ppb maximum 1-hour concentration not to be exceeded more than once per year.
FEDERAL Standards -
1) 120 ppb maximum 1-hour concentration with no more than one expected exceedance per year.
2) Fourth highest daily maximum 8-hour average for a 3-year period not to exceed 80 ppb.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Nitrogen Dioxide (ppb)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MAXIMA 1-HOUR 1ST MM/DD/HH	MAXIMA 1-HOUR 2ND MM/DD/HH	ARITH MEAN	% >MDV
BEULAH	1998	JAN-MAR	2148	32 01/06/16	28 03/30/11	5.2	88.2
DGC #12	1998	JAN-MAR	2117	36 03/31/20	36 03/31/21	4.9	100.0
DGC #17	1998	JAN-MAR	2084	115 01/08/03	64 02/15/07	4.0	92.8
FARGO RESIDENTIAL	1998	JAN-MAR	2145	49 01/28/19	47 01/28/20	7.9	80.7
HANNOVER	1998	JAN-MAR	2141	36 01/21/03	29 01/21/04	2.7	65.4
SHARON	1998	JAN-MAR	2147	16 01/14/20	16 01/14/21	1.7	30.4

The maximum 1-hour concentration is 115 ppb at DGC #17 on 01/08/03

* The air quality standards are:
STATE - 53 ppb maximum annual arithmetic mean.

FEDERAL - 53 ppb annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable $PM_{2.5}$ Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 24-HOUR 1ST MM/DD	MAXIMA 24-HOUR 2ND MM/DD	MAXIMA 24-HOUR 3RD MM/DD	ARITH MEAN	#> 50	AM>20	% >MDV
BEULAH	1998	JAN-MAR	15	4.4	16.0 03/18	15.5 01/23	12.8 02/16	9.4			100.0
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	5.4	18.1 03/06	17.4 01/17	16.5 01/23	11.6			100.0

The maximum 24-hour concentration is 18.1 µg/m3 at BISMARCK RESIDENTIAL on 03/06

FEDERAL Standards -
1) 24-hour: 3-year average of 98th percentiles not to exceed 65 $\mu g/m^3$.
2) Annual: 3-year average not to exceed 15 $\mu g/m^3$.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Particulates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 24-HOUR 1ST MM/DD	2ND MM/DD	3RD MM/DD	ARITH MEAN	#>150	AM>50	% >MDV
BEULAH	1998	JAN-MAR	13	2.0	17.7 03/18	15.3 02/16	13.0 01/05	10.5			92.3
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	4.1	26.6 03/06	20.4 03/12	19.5 01/23	12.9			100.0
DICKINSON RESIDENTIAL	1998	JAN-MAR	13	1.8	19.3 03/18	11.8 01/17	9.7 03/24	7.0			76.9
DRAGSWOLF	1998	JAN-MAR	11 ***	6.0	15.0 03/18	9.0 02/16	9.0 02/22	8.0			100.0
FARGO RESIDENTIAL	1998	JAN-MAR	15	3.0	19.8 02/16	18.9 03/12	16.2 02/22	11.2			86.6
GRAND FORKS - NORTH	1998	JAN-MAR	14	7.8	38.4 01/17	25.0 02/22	23.8 01/05	19.5			100.0
SHARON	1998	JAN-MAR	15	0.8	8.6 01/23	8.4 01/11	6.5 03/18	4.9			66.6
WHITE SHIELD	1998	JAN-MAR	14	5.0	15.0 03/18	14.0 01/17	14.0 03/24	8.9			100.0
WILLISTON RESIDENTIAL	1998	JAN-MAR	12	5.9	15.9 03/06	15.5 03/30	14.7 03/18	11.4			100.0

The maximum 24-hour concentration is 38.4 $\mu g/m3$ at GRAND FORKS - NORTH on 01/17

* The STATE and FEDERAL air quality standards are:
1) 150 $\mu g/m3$ maximum averaged over a 24-hour period with no more than one expected exceedance per year.
2) 50 $\mu g/m3$ expected annual arithmetic mean.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable $PM_{2.5}$ Sulfates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 24-HOUR 1ST MM/DD	MAX 24-HOUR 2ND MM/DD	MAX 24-HOUR 3RD MM/DD	ARITH MEAN	#>15.	AM>5.	% >MDV
BEULAH	1998	JAN-MAR	15	1.5	4.9 03/18	4.4 01/23	3.5 02/16	2.8			100.0
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	0.9	5.3 03/06	4.9 01/17	4.9 01/23	2.9			100.0

The maximum 24-hour concentration is 5.3 µg/m3 at BISMARCK RESIDENTIAL on 03/06

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : Inhalable PM_{10} Sulfates ($\mu g/m^3$)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAX 24-HOUR 1ST MM/DD	MAX 24-HOUR 2ND MM/DD	MAX 24-HOUR 3RD MM/DD	ARITH MEAN	#>15.	AM>5.	% >MDV
BEULAH	1998	JAN-MAR	13	1.0	5.3 03/18	4.3 01/05	3.9 02/16	2.9			100.0
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	0.8	6.0 02/10	5.9 03/06	5.2 01/17	3.3			100.0
DICKINSON RESIDENTIAL	1998	JAN-MAR	13	1.0	5.0 03/18	3.4 01/17	3.4 01/23	2.4			100.0
FARGO RESIDENTIAL	1998	JAN-MAR	15	0.7	5.0 02/22	4.1 01/23	3.3 02/16	2.4			100.0
GRAND FORKS - NORTH	1998	JAN-MAR	14	1.4	5.3 03/24	3.7 02/10	3.3 02/22	2.5			100.0
SHARON	1998	JAN-MAR	15	0.7	3.8 01/23	2.9 03/18	2.8 03/24	2.0			100.0
WILLISTON RESIDENTIAL	1998	JAN-MAR	12	1.0	6.7 03/18	4.2 01/23	4.1 01/17	2.9			100.0

The maximum 24-hour concentration is 6.7 µg/m3 at WILLISTON RESIDENTIAL on 03/18

* No standard is currently in effect.

*** Less than 80% of the possible samples (data) were collected.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : $PM_{2.5}$ Sulfate/PM_{25} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 1ST MM/DD	MAXIMA 2ND MM/DD	MAXIMA 3RD MM/DD	ARITH MEAN
BEULAH	1998	JAN-MAR	15	21	38.6 01/11	36.3 03/24	34.7 01/05	29.6
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	13	42.6 03/24	34.5 02/10	31.9 01/11	25.0

The maximum 24-hour ratio is 42.6 percent at BISMARCK RESIDENTIAL on 03/24

* No standard is currently in effect.

COMPARISON OF AIR QUALITY DATA WITH
THE NORTH DAKOTA AMBIENT AIR QUALITY STANDARDS *

POLLUTANT : PM_{10} Sulfate/PM_{10} Total Mass Ratio (Percentage)

LOCATION	YEAR	SAMPLING PERIOD	NUM OBS	MIN	MAXIMA 1ST MM/DD	MAXIMA 2ND MM/DD	MAXIMA 3RD MM/DD	ARITH MEAN
BEULAH	1998	JAN-MAR	12	15	35.8 03/12	34.4 02/10	34.3 03/24	27.5
BISMARCK RESIDENTIAL	1998	JAN-MAR	15	11	70.7 01/05	51.5 01/11	44.6 03/24	29.7
DICKINSON RESIDENTIAL	1998	JAN-MAR	10 ***	17	57.6 01/23	44.6 02/16	38.0 03/06	33.4
FARGO RESIDENTIAL	1998	JAN-MAR	13	9.5	37.3 01/05	31.7 01/17	30.9 02/22	22.5
GRAND FORKS - NORTH	1998	JAN-MAR	14	5.9	24.4 01/11	24.2 03/30	24.1 03/24	14.1
SHARON	1998	JAN-MAR	10 ***	18	59.6 03/24	47.3 02/22	44.6 03/18	36.7
WILLISTON RESIDENTIAL	1998	JAN-MAR	12	6.5	45.6 03/18	35.6 01/11	34.9 02/04	26.9

The maximum 24-hour ratio is 70.7 percent at BISMARCK RESIDENTIAL on 01/05

* No standard is currently in effect.

*** Less than 80% of the possible samples (data) were collected.

SECTION THREE

EXCEEDANCE LISTINGS

By Site Date Hour

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

SITE=DGC #17

DATE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
January 8, 1998	300	5						115*		6.1	91.4		

SITE=MANDAN REFINERY - SPM

DATE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
February 27, 1998	2300	208	181	116*	271					WTHR	333		
February 28, 1998	2300	66	74	143*	141					WTHR	343		

By Date Hour Site

All Units Are in Parts Per Billion Except Wind Direction (Degrees),
Wind Speed (MPH), CO (PPM), and $PM_{2.5}$ and PM_{10} ($\mu g/m^3$)

The * Identifies the Exceedances

DATE=January 8, 1998

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
DGC #17	300	5						115*		6.1	91.4		

DATE=February 27, 1998

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
MANDAN REFINERY - SPM	2300	208	181	116*	271					WTHR	333		

DATE=February 28, 1998

SITE	HOUR	1-HOUR SO2	3-HOUR SO2 BLOCK	24-HOUR SO2 BLOCK	5-MIN SO2 MAX	H2S	24-HOUR H2S BLOCK	NO2	O3	WS	WD	PM10	PM25
MANDAN REFINERY - SPM	2300	66	74	143*	141					WTHR	34		